NON-PUBLIC?: N
ACCESSION #: 8904180249
LICENSEE EVENT REPORT (LER)

FACILITY NAME: McGuire Nuclear Station PAGE: 1 of 5

DOCKET NUMBER: 05000370

TITLE: A Unit 2 Reactor Trip Occurred Because Of An Unknown
EVENT DATE: 03/03/89 LER #: 89-001-00 REPORT DATE: 04/03/89

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Alan Sipe TELEPHONE: 704-875-4183

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On March 3, 1989 at 0819, while Operations personnel were performing a routine Rod Cluster Control Assembly Movement Test, on the Unit 2 Rod Control system, a High Negative Neutron Flux Rate Reactor Trip occurred because of control rods dropping into the core. The Turbine Generator automatically tripped because of the Reactor Trip. Operations personnel implemented the Reactor Trip recovery procedure to recover from the transient. At 0855, Operations personnel made the required notification to the NRC. Since it could not be determined what caused the Control Rods to drop, an Independent Technical Review was performed on the event; consequently, a decision was made by Station Management personnel at approximately 0230 on March 4, 1989 to restart the Reactor. Unit 2 was returned to Power Operation on March 4, 1989 at 0555. This event is assigned a cause of Unknown because it could not be determined during the course of this investigation what caused the control rods to drop into the core.

END OF ABSTRACT

EVALUATION:

Background

The Full Length Rod Control system EIIS:AA! is used for Reactor EIIS:RCT! control, Startup, and Shutdown to compensate for short term reactivity changes. Every 31 days, each Control Rod EIIS:Rod! Drive Bank is determined operable by movement of at least 10 steps in any one direction. This operability determination is accomplished by procedure PT/2/A/4600/01, Rod Cluster Control Assembly (RCCA) Movement test. Each RCCA has a position indicator channel which displays the position of the assembly. The displays of assembly positions are grouped for the convenience of the operator. Fully inserted assemblies are further indicated by a rod at the bottom signal, which actuates a local alarm and a Control Room annunciator EIIS:ANN!. Full length RCCA are always moved in preselected banks, and the banks are always moved in the same pre-selected sequence. Mechanical failures of the RCCAs are in the direction of insertion or immobility.

Description of Event

On March 3, 1989, Operations (OPS) personnel were performing the RCCA Movement test and had inserted Shutdown Bank E to 220 steps. As Shutdown Bank E was being withdrawn, a High Negative Neutron Flux Rate Reactor Trip occurred at 0819 because of control rods dropping into the core. The Turbine EIIS:TRB! Generator EIIS:GEN! automatically tripped because of the Reactor Trip. OPS personnel manually initiated a Reactor Trip to ensure the Reactor Trip Breakers EIIS:BRK) had opened. OPS personnel implemented the Reactor Trip recovery procedure, AP/2/A/5500/01, to recover from the transient. Motor EIIS:KO! Driven Auxiliary Feedwater (CA) system EIIS:BA! Pumps EIIS:P! 2A and 2B automatically started on a Low Low Steam Generator (S/G) EIIS:SG! 2B level signal at 0820. Reactor Coolant (NC) system EIIS:AB! T-average dropped below 553 degrees-F because of the erratic response of the Steam Dump Controller and at 0822, a Main Feedwater (CF) system EIIS:SJ! Isolation occurred as designed on a Low NC system T-average signal coincident with a Reactor Trip. OPS personnel secured the CA pumps when the CF Isolation was reset and CF restored.

OPS personnel initiated an emergency priority work request to have Instrumentation and Electrical (IAE) personnel troubleshoot the power cabinets EIIS:CAB! for the Rod Control system. OPS personnel made the required notification to the NRC according to the NRC Immediate Notification Requirements procedure, RP/O/A/5700/10, at 0855.

IAE personnel checked for loose connections, loose cables, and failed fuses EIIS:FU! in the power cabinets that supplied power to Shutdown Banks C, D, and E. The main fuses for the power cabinets to Shutdown Banks C, D, and E were cut open for further inspection. Continuity checks were performed and fuse clamp holders were also inspected. There were no problems noted. These inspections were also performed on the other Control Rod Banks with the exception of cutting open the main fuses for the power cabinets and no problems were noted.

On March 3, 1989 at approximately 1130, a technical review group consisting of IAE, Westinghouse Site Electrical Representative, OPS, Performance, and Station Management personnel met to evaluate the event. After evaluating the investigation, troubleshooting and other facts associated with this event, the technical review group determined the next step would be to restart the Reactor to 1.0 E-8 amps to perform further troubleshooting and testing. With the rods in this position, the RCCA Movement test was performed three times on all Control Rod Banks. Shutdown Banks C, D, and E were cycled several more times to try to recreate the same event. There were no problems noted and the mechanism which caused the control rods to drop could not be repeated.

On March 4, 1989 at 0230, after all troubleshooting was complete and no problems were noted, the technical review group determined that it would be safe to return the unit to Power Operation. This course of action was discussed with the NRC Resident Inspector and he had no further suggestions for corrective actions and concurred with the restart decision.

Unit 2 was returned to Power Operation on March 4, 1989 at approximately 0555.

Conclusion

This event was assigned a ca
se of Unknown because it could not be determined
during the course of this investigation what caused the control rods to drop in the core. The RCCA Movement test was a routine test performed every thirty one days. The Control Room operators felt very comfortable performing the RCCA Movement test. Unit 2 was at steady-state reactor operations at normal operating temperature and pressure. Also, there were no procedure discrepancies noted. Extensive and thorough troubleshooting by IAE and OPS personnel did not uncover the cause of the rods dropping into the core nor could the event be repeated. The technical review group reviewed all investigations and troubleshooting involved in the event and concluded that it would be safe to return the unit to Power Operation. During the next Unit 2 Refueling Outage when a RCCA Movement test is being performed, IAE personnel will inspect all firing cards and monitor the currents for the Rod Control system.

OPS personnel responded to the transient in a timely manner to stabilize the unit. There were a few abnormalities noted during this Reactor Trip. The S/G no load pressure was erratic and NC system T-average no load value reached 551 degrees-F because the Steam Dump Controller EIIS:XC! was acting erratic. OPS

Control Room personnel placed the controller in manual to control NC system T-average and S/G no load pressure was maintained at approximately 1050 psig. IAE personnel adjusted the volume boosters for the Steam Dump Controller. The compensation voltage for NIS-N36 EIIS:DET!, Nuclear Instrumentation Intermediate Range Channel, was undercompensated. The purpose of the compensation voltage is to offset gamma flux during shutdown such that the source range will be energized at the proper time. IAE personnel adjusted the compensation voltage to correct the problem. This adjustment is considered to be a standard operating practice. CF Pump 2A would not reset from the rollback hold mode. OPS personnel have initiated Work Request 68709 to replace an integrated circuit chip in the rollback hold circuitry. This chip was replaced on March 15, 1989. NC

system Loop B Overpower Delta Temperature setpoint did not respond properly for the NC system T-average change. IAE personnel replaced the failed Lead/Lag card in the Overpower Delta Temperature Loop. S/G D CF Bypass Control valve EIIS:FCV! did not respond correctly. A work request has already been initiated to resolve this problem.

All primary and secondary system key parameters, with the exception of those noted above, responded as expected during this Reactor Trip. Approximately 30 minutes after the Reactor Trip, Pressurizer EIIS:PZR! level and pressure, and S/G levels had all achieved stable no-load conditions. S/G no load pressure and NC system T-average no load value was erratic because of the erratic response of the Steam Dump Controller. These conditions stabilized when the Steam Dump Controller was placed in manual.

A review of the McGuire LERs for the previous 12 months revealed one previous event involving a Reactor Trip in which the root cause was unidentifiable; therefore, according to the Nuclear Safety Assurance guidelines this event is considered recurring. However, the two events are not similar in any other respect; therefore, the corrective actions for LER 369/88-005 could not have prevented this event from occurring.

The Post Reactor Trip Plant Response is classified as a Category A since all transient classification criteria fell within Category A (plant responses remained within preferred or expected bounds).

This event is not reportable to the Nuclear Plant Reliability Data System (NPRDS).

CORRECTIVE ACTIONS:

Immediate: OPS personnel implemented the Reactor Trip recovery procedure, AP/2/A/5500/01.

Subsequent: IAE personnel performed troubleshooting on the power cabinets for the Rod Control System and found no problems.

Planned: 1) IAE personnel will investigate and adjust as necessary the control inputs from the Steam Dump valves to the Steam Dump Controller.

2) As an added precaution, OPS personnel will evaluate procedures OP/1,2/A/6150/08, Rod Control, for clarity of steps involving use of the Control Rod drive motor generator sets during startup.

3) IAE personnel will investigate the most appropriate mechanism (use existing Preventative Maintenance work request or initiate a new work request) to inspect the firing cards for the Rod Control system.

SAFETY ANALYSIS:

The Reactor Trip occurred while moving Rod Control Shutdown Bank E. The Turbine Generator automatically tripped because of the Reactor Trip. This Reactor Trip initiating transient is bounded by the "Rod Cluster Control Assembly Misoperation" and the "Turbine Trip" events of the McGuire Final Safety Analysis Report Accident Analysis, Chapter 15.

A CF system Isolation occurred and the Motor Driven CA pumps automatically started approximately 1 minute after the trip to provide feedwater to the S/Gs to maintain a heat sink. All primary and secondary system parameters necessary to assure a safe shutdown were at or approaching no-load conditions approximately 30 minutes after the trip with the exception of S/G no load pressure and NC system T-average no load value which was erratic because of the erratic response of the Steam Dump Controller. S/G Pressure Operated Relief Valves (PORVs), S/G Code Safety Valves, NC system PORVs or Code Safety Valves were not challenged.

Emergency core cooling and emergency electrical power were not required and were not actuated. The event presented no hazard to the integrity of the NC or Main Steam systems EIIS:SB!. There were no radiological consequences as a result of this event.

There were no personnel injuries, radiation overexposure, or releases of radioactive material as a result of this event.

This event is considered to be of no significance with respect to the health and safety of the public.

ATTACHMENT 1 TO 8904180249 PAGE 1 OF 1

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McGuire Nuclear Station
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DUKEPOWER

April 3, 1989

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: McGuire Nuclear Station Unit 2
Docket No. 50-370
Licensee Event Report 370/89-01

Gentlemen:

Pursuant to 10CFR 50.72 and 50.73 Sections b(2)ii and a(2)iv respectively, attached is Licensee Event Report 370/89-01 concerning a Unit 2 Reactor Trip. This report is being submitted in accordance with 10CFR 50.73. This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

Hal B. Tucker

ARS/bcb

Attachment

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